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ANALYZING CONSUMER JUDGMENT STRATEGIES:
PARADIGMS, PRESSURES AND PRIORITIES

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College of Commerce and Business Administration
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The focal point of consumer research is the judgment process of the individual consumer. In order to ultimately influence a person's evaluations of competing alternatives through marketing activity, the information handling strategies he adopts in forming these judgments must be rigorously understood. Newell (18) cites three basic questions which must be confronted in developing such an understanding: (1) upon what information is the judgment based?, (2) what is the judgmental law?, and (3) what factors other than the basic input information affect the judgmental law? The first question concerns identification of the relevant cues. Research on cognitive structure and information processing provides a reasonable basis for inferring that a person's beliefs about product-related outcomes or attributes are important cues. Given that the basic nature of the input cues on which consumer judgments are based is known, the question of the composition rule becomes relevant. What strategy is used in integrating these cues to arrive at an overall evaluation? The word "strategy" is appropriate because it underlines the likelihood that a consumer adapts his choice of a composition rule to suit the situation; the second and third questions cannot be readily separated. Composition rule questions have important implications for marketing tactics (8, 27). This study explores factors influencing the use of different judgment strategies by consumers and of different research approaches to the study of judgment by consumer researchers.

ANALYZING JUDGMENT STRATEGIES

Consumer judgment may be envisioned as involving the plotting of information (an individual's beliefs) about an alternative onto a "grid" of evaluative dimensions (Figure 1a). Each dimension in this judgment

space is segmented into a number of different categories corresponding to the specific characteristics or qualities the person recognizes on that dimension. The individual mentally projects each product so that it falls into some category along each dimension. Each of these segments is weighted in the course of judging. This weight can be interpreted as reflecting the potential impact on the judgment of that location vis-a-vis other locations along the dimension. Further, each dimension is weighted to reflect its relative impact as a data source vis-a-vis other dimensions. <u>The distinction between intra-dimensional weighting and inter-dimensional weighting must be maintained if judgment rule models are to be clearly understood.</u> Although the importance of this distinction in research on judgment policies has been observed repeatedly (2, 24), consumer researchers have in many cases unsystematically mixed inter- and intra-dimensional weights together in the same model (e.g., 7, 17, 21, 23).[1]

Differences in weighting (of characteristics or of dimensions) will evolve in two basic ways. (1) One location on D_1 may be weighted heavier than another because it implies more extreme satisfaction or dissatisfaction to the individual. One dimension (D_1) may be weighted relatively heavier than another (D_2) because differences in the locations along that dimension imply greater differences in overall satisfaction to the person than do differences along D_2. Thus a particular weighting pattern arises in part from how the individual values different types of product-related outcomes. (2) A particular weighting pattern may arise because such a scheme enables the person to handle his judgmental problem efficiently under the circumstances. Simplifying considerations become salient. The eventual weighting pattern employed reflects the individual's struggle to make as accurate evaluations as possible (a) given his own value system and (b) given the situational pressures.[2]

The question of the composition rule is in large part one of analyzing the weighting arrangement within the judgment space at the time the judgment is made. Several formal models depicting different judgment-space weighting schemes have been proposed. The most common, a linear additive model (often approximated by the linear regression model) traditionally assumes differential inter-dimensional weighting but equal intra-dimensional weighting. A conjunctive model portrays the individual as setting up critical cutoff points along each dimension (in effect dichotomizing the dimension) and requiring a product to surpass all of these simultaneously to receive a high evaluation. This implies disproportionately heavy weighting of the negative and of the dimensions. A disjunctive model assumes the evaluation will be high only if the product is superior along some dimension; the positive end of the dimension is weighted very heavily. Neither the conjunctive nor the disjunctive models are compensatory. A third model is the lexicographic. Here the individual is assumed to order the dimensions in his mind and use only one (the most salient) in judging alternatives. Only if no clear distinction can be made using that dimension does he introduce a second dimension into the process and repeat the comparisons (and then a third, fourth, etc., if needed).

As can be seen from figure 1, each model defines a particular weighting arrangement within the judgment space. Any of these might be chosen because of the consumer's theory about how the alternatives under consideration relate to obtaining maximal satisfaction. For example, conjunctive weighting might emerge when the person perceives a high penalty associated with an error of inclusion and little reward associated with making the outstanding selection (27). Of greater

relevance to this study is that each of these weighting schemes may allow a simplification of the judge's information processing burdens. For example, if both the dimensions and the locations along each dimension are equally weighted in the judge's mind, he must distribute his attention equally across the whole matrix (Figure 1b). This would be fairly tedious. If he is able to weight dimensions differentially, he can simplify things somewhat by focusing attention on cues about the more prominent dimensions (Figure 1c). Or if he chooses either conjunctive weighting or disjunctive weighting, he can be particularly attentive to cues falling within the regions at either end of the dimension (Figure 1d and 1e). Processing is still simpler if both inter- and intra-dimensional weighting are applied (Figure 1f), and a lexicographic approach reduces the workload still further (Figure 1g). The ultimate in cognitive simplification appears to be combination lexicographic-conjunctive strategy (Figure 1h). Russ (20) has labeled this strategy "satislex" and Tversky (25) calls a closely related version "elimination by aspects."

One approach to the study of consumer judgment processes would entail fitting mathematical models to consumer-generated judgments. As noted, the linear regression model has often been used to approximate a linear additive strategy. Einhorn (10) has recently proposed mathematical approximations for the conjunctive and disjunctive models which involve log transforms of the stimulus <u>and</u> response dimensions. The models are contrasted in Figure 2. All are actually fit by regression techniques. Several observations about these latter models can be made: (1) they are justifiable attempts to quantitatively approximate theoretical models; (2) they are only approximations;

(3) they may be interpreted as "attentional discounting" models (2, 27) and thus provide an opportunity to investigate cognitive simplification processes by comparing their fits under different judgmental conditions. Goldberg (13) suggested several "control" models which such comparisons might include, and a "disjunctive control" model also seems appropriate.

TASK FACTORS

Paradigms

Two research paradigms tapping different parts of the judgment process may be contrasted. A "reconstruction" paradigm extracts information from an individual about a real, existing product. The person's judgment has been formed before he enters the research situation. This is the paradigm favored in studies of consumer judgment structure; the object of evaluations has been an existing brand (e.g., 7, 17, 22, 23), television show (15), etc. The subject is asked to report the already formed belief system underlying the existing judgment. Clearly such a paradigm extracts post-judgment (or processed) information.

Consumers faced with this task may frequently be "working backward" in their mind from the summary judgment (of which they are well aware) to the underlying beliefs. Such summary judgments are made originally to relieve the person from continually reviewing an elaborate informational network whenever a response is called for. High correlations between attitude and beliefs in this paradigm can be as reasonably interpreted as measuring an ability to predict beliefs from attitude as vice-versa. In many cases the original belief

system upon which the judgment was based has probably become disassociated somewhat in the consumer's mind (16). In filling in the set of scales, he is forced to recreate a portion of the system on the spot; forcing a common set of dimensions on each subject would accentuate this need. What sort of picture might emerge? Both consistency theory (6) or self-persuasion theory ([illegible]) suggest the belief system described will be linear and compensatory in appearance. The former posits a drive for cognitive equilibrium, leading to an alignment of underlying beliefs with the existing judgment. This applies even where no recreation of beliefs is necessary. The latter portrays the subject as reasoning, "I know my overall judgment evaluation, so I must believe such and such." In any case, the reconstruction paradigm may favor a linear compensatory model.

In contrast, a "construction" paradigm forces the subject to integrate separate pieces of new information or reintegrate new with old into an overall summary evaluation. The subject here is clearly processing information. His beliefs about alternatives are controlled by the researcher. Such a paradigm may not be as conducive to the linear model since actually employing approaches such as the conjunctive or disjunctive may in this case be the simpler strategy for the consumer. Since both paradigms are valid sources of certain types of information interesting to market researchers, the biases they exert on the apparent validity of models with different functional forms is worth examining.

Pressures

If Einhorn's models do yield a simplified judgment space, situational factors which make simplification attractive to the consumer

should increase their use. Many judgments made by consumers occur under time pressures of some sort, as when other concurrent or impending tasks place demands on his attention. The hypothesis investigated was that increasing the time pressures surrounding the judgment would result in increased use of nonlinear strategies in the construction paradigm. In the reconstruction paradigm, where linear processing may actually be easier, time pressures should lead to increased use of the linear strategy.

PROCEDURE

The Construction Task

Each subject was presented with a set of information about each of 30 automobile models. Each model was identified only by a number. The information described that model's status on five evaluative dimensions which a pilot study had established as those most frequently elicited (in free response) by a similar sample of subjects. These dimensions were: selling price, riding comfort, styling, cost of maintenance, and ease of handling. Seven point bipolar scales were used to present the information. Endpoints of these scales were labeled "greatly above average" and "greatly below average" with the midpoint labeled "average." All of the models in the set were described as belonging to the $4000 and under class of cars, and subjects were instructed that the norms implied by the scale labels referred to that category. In making a judgment, subjects were instructed to view the attribute information as constituting their own beliefs, rather than as some other party's beliefs. In other words, when they encountered the cue that a car model was "average" in styling, they were to assume

that they themselves perceived it as "average" to induce the subject to give the scale on which information was presented a subjective interpretation. The set of car models described did not have specific real-world analogues but were constructed from the set of possible descriptors. Brunswik (6) has pointed out that the judgmental stimuli should be representative of those encountered in nature if generalizable results are desired; the judge should not be faced with configurations of cues which have never occurred before in his experience nor are likely to in the future. This problem was partially handled here by the instructions to subjectively interpret the evidence and by the presentation of that evidence in comparative form vis-a-vis the subjectively located "average" for the class. Additionally, comparisons of the experimental descriptor combinations with the descriptions of real car models evoked on similar scales in pilot studies and in the "reconstruction" task portion of the current study disclosed that the hypothetical stimuli were certainly not unrealistic.

Each subject was asked to evaluate the stimulus cars according to the likelihood that he would purchase that model for himself upon graduation from college. He indicated this judgment on a four-point scale. The points were labeled "extremely high probability that I would purchase this model for myself", "moderate probability....", "slight probability....", and "extremely low probability....". The judgment criterion was not then a general affective evaluation of the car but was a probabilistic judgment focusing on a specific act in a given context. Each subject repeated this judgment for each of the models.

The Reconstruction Task

Each subject was given the brand and model names of 30 existing cars in the $4000 and under category (Chevrolet Vega, Ford Mustang, Triumph TR-4, etc.). For each he was asked to (1) indicate the likelihood that he would purchase that model for himself upon graduation, and (2) indicate his beliefs about the model on the five evaluative dimensions cited in the construction task. The scales for the criterion judgment and for the dimensional information were identical to those described for the construction task.

The Time Pressure Manipulation

The two conditions will be labeled Time Pressure (TP) and No Time Pressure (NTP). No implication is intended that these labels imply anything more than ordinal gradations along some absolute time pressure continuum. Subjects in the TP treatment were advised that other tasks awaited them upon completion of the current task. They were instructed to make accurate judgments but to be aware that there was also a need to proceed through the task as rapidly as they could without sacrificing accuracy. In order to increase their awareness of the timing element, a research assistant recorded the time elapsed at ten second intervals on a visible blackboard. Subjects were instructed to list the elapsed time on their questionnaire when they were through. Subjects in the NTP condition were advised that they should take however much time was necessary in giving a considered and accurate response to the task. They were told that previous subjects usually took about 20 minutes and that there was no reason for them to hurry.

Supplementary Study

Subjects in the above study were responding to somewhat different stimulus sets depending upon which paradigm they were in, i.e., the cars described in the construction task could not of course identically match those the "reconstructing" subjects described. An alternate explanation for any observed differences in judgment strategies might then be attributed to these stimulus differences. Such an explanation is highly tenuous but a supplementary study was performed to test this idea nevertheless. In this study, 15 subjects first went through the reconstruction portion of the original study (NTP). Two weeks later each was recontacted and asked to perform the construction task. Here each subject was presented with the descriptions he himself had furnished in the previous paradigm. Each was informed he was judging his own descriptions but was asked not to attempt duplicating any previous judgments. The scales used were identical to those in the first study and subjects were similar.

Subjects

The subjects were males, aged 19-22, who were approaching a change in their financial status (graduation from college) which made them likely purchasers of an automobile in the near future. They had diverse socio-economic backgrounds and were each majoring in business administration at a major university.

DATA ANALYSIS

For each subject, multiple correlations were computed between his actual judgments and the judgments predicted by each model. Linear regression analysis determined the weighting parameters for each model. For the conjunctive, disjunctive, and control models the

appropriate log-transformed variables were entered into the regression analysis. No cross-validation was attempted since the limited number of observations did not make sample splitting appropriate. Shrinkage has typically been quite small in judgment studies (24). Since all models included the same number of parameters the shrinkage in cross-validation should have been approximately uniform (13), and comparative analysis across conditions is the major interest here.

RESULTS

Table 1 presents the multiple correlations for each model for each of the subjects under the various treatments. The exponential model is not presented since in no case did it provide the best fit to a subject's data. In order to provide insight into the relative performance of the respective models, factorial analysis of variance was performed, using as a dependent variable the multiple correlations (transformed using Fisher's _z_ transformation) for each subject. The factors were: (a) Paradigm (two levels--construction and reconstruction); (b) Time Pressure (two levels), and (c) Models (five levels--linear, conjunctive, conjunctive control, disjunctive, disjunctive control). Factor C was considered a repeat measures factor. The summary of the analysis of variance is presented in Table 2.

All three main effects were significant, and the two predicted second order interactions were also significant. In order to explore these effects, the treatment means are summarized in Table 3. The significant paradigm effect results from the models providing generally closer fits for subjects in the reconstruction paradigm versus those in the construction paradigm. Operating under acute time pressures

also resulted in a lower mean correlation (.656) than under lower time pressures (.754). A significant models effect was also obtained. The model means were: linear - .732; conjunctive - .722; conjunctive control - .734; disjunctive - .670; disjunctive control - .684. Neuman-Kuels post hoc analysis showed the means for the disjunctive and disjunctive control models were significantly lower than the other three models.

Of greater interest are the significant interaction effects involving the models factor. The models x paradigm interaction stems from the comparatively higher correlations obtained for the disjunctive weighting models in the construction task versus the relatively lower correlations for these models where subjects were recreating their existing belief systems. The models x time pressure interaction is likewise traceable to differences between the disjunctive weighting models and the others. Under acute pressure, the non-disjunctive models were more accurate while under lower time pressures the disjunctive models produced markedly higher correlations. The strength of the effects is estimated by the w^2 statistic. Time pressure was by far the most influential factor in this study. The finding that the main effect of the models factor was considerably weaker than interactions involving it with the other two factors is also of interest.

Analysis at the level of the individual subject is important in addition to cross-subject analysis as supplied by the analysis of variance. Consequently for each subject the model yielding the highest multiple correlation (R-max) was noted. The frequency of best fits as a function of paradigm and time pressure is shown in Table 4. These data were organized in various ways to explore systematic

patterns in the relative superiority of the different models. To examine the contrast between linear and nonlinear models across task paradigms, subjects were collapsed over time pressure treatments, and partitioned into those best fit by the linear model and those best fit by any nonlinear model. Nonlinear model best-fits were more frequent under both paradigms but this pattern was more pronounced in the construction paradigm ($X^2 = 6.62$, $p < .05$).

When a nonlinear model was most appropriate, what factors affected which nonlinear model gave the R-max? Subjects best fit by nonlinear models were partitioned into those described by conjunctive weighting (test and control models) and those described by disjunctive weighting (test and control models). These were classed according to time pressure condition within each separate paradigm. When constructing judgments, acute time pressure produced greater relative frequency of conjunctive weighting (C = 28; D = 8); lower time pressure yielded greater frequency of disjunctive weighting (C = 11; D = 16). Chi-square analysis showed a significant relationship ($X^2 = 8.86$, $p < .01$). In contrast, time pressure differences had no effect when reconstructing, with conjunctive weighting generally more frequent.

The appropriateness of the control models is another important question. Subjects were partitioned into those best fit by nonlinear test models and those best fit by nonlinear control models. Since time pressures had no apparent effect on the likelihood of these, subjects were grouped by paradigms collapsed over time pressure treatments. When a nonlinear model was most appropriate in reconstruction, the <u>test</u> conjunctive or disjunctive model more often gave the best fit (Test = 33; Control = 14); in constructing, the <u>control</u> models

were more frequently optimal (Test = 1[illegible], control = [illegible]). This pattern was significant (X^2 = 18.[illegible]0, p < [illegible]).

In a previous information processing study, Einhorn, Komorita and Rosen (12) found that in cases where the conjunctive model tended to be best-fitting subjects' judgment policies were highly predictable (i.e., above the median sample multiple correlation). Subjects best fit by linear or disjunctive models were not as highly predictable, with multiple R's falling more often below the sample median. An identical pattern emerged in this study but only in the time pressure condition. The median R-max in that condition was .638. Sixteen of the 25 subjects best fit by the conjunctive models (test or control) fell above the median. The corresponding figures for the linear and disjunctive models were 1 of 6 and 2 of 7 respectively. Under no time pressure, R-max's were evenly distributed.

Thus far only one avenue open to the subjects in simplifying their information processing tasks has been examined--differential weighting of certain locations along the dimensions. Another device for simplification noted earlier entailed restricting attention to a small number of dimensions. To examine the possibility that subjects used this approach in adapting to the experimental conditions, the number of dimensions with statistically significant (p < .05) regression coefficients was calculated for each subject (Table 5). Since the individual is the unit of analysis, these weights can be given a meaningful psychological interpretation; they indicate those dimensions the individual was apparently using systematically in ordering his judgments of the car models. Analysis of variance shows a significant interaction effect on the number of dimensions used (Table 6).

When constructing judgments, increased time pressure led to a reduction in the mean number of dimensions used, while in reconstructing, time pressure had no effect.

The results of the supplementary study in which subjects first reconstructed their evaluative belief system for a known car model, then used their own descriptions as input for forming judgments in ignorance of model names, are summarized in Table 7. This data provides an opportunity to contrast the profiles of information about individuals' evaluative structure which might emerge from the two data collection paradigms. It is obvious that many subjects were using their judgment space in strikingly different ways when responding under the two paradigms. In only two cases was the same model optimal in fitting both the reconstructed judgments and those formed on the basis of this reconstructed evidence. In six cases the subject shifted from weighting one end of the evaluative dimensions heavily to weighting the opposite end heavily. The dimensions which show up as particularly prominent in the individual's judgment policy also vary considerably between paradigms although there is some evidence of consistency. Finally the correlations between an individual's judgments toward the cars when aware of model name and that recorded when he relies on his own stated beliefs about model properties is only moderate.

DISCUSSION

One objective of this study was to compare two possible paradigms used in research on judgment and choice processes to see whether they tended to systematically favor different multidimensional models in a manner consistent with the different stages of the judgment process

they examine. As predicted the straightforward linear model was the most accurate of those tested in describing the recreated belief systems underlying the subjects' overall judgments of competing automobiles. It produced the highest mean correlation when subjects were considered collectively, and provided an optimal fit for the largest number of individuals. The general robustness of the linear model in describing data generated by a variety of non-linear processes is well recognized of course (14); in this case however theoretical rationales predicting an apparent alignment of beliefs with attitudes in the post-judgment stage of information processing abound, and the linear model's success may be a mirror of linear processes. By comparison, nonlinear models yielded better mean correlations and higher incidence of best-fits for individual subjects when the task entailed actual processing of information rather than a replay of processed information.

The major effect that increased time pressure had in the reconstruction task was in reducing the likelihood that disjunctive weighting would be found. Subjects in a hurry were less likely to describe a structure in which fine discriminations were made at the positive end of dimensions. The linear or conjunctive models would have provided close fits in that case but not the disjunctive. When timing was less a factor, all models provided about the same accuracy and gave optimal individual fits about as often. These models will of course make quite similar predictions for fairly homogeneous belief systems; they will differ only for certain configurations of beliefs. The generally higher level of correlations obtained in the reconstruction paradigm regardless of what we assume about within-scale weighting

would be expected, and provides additional evidence of the post-judgment informational alignment consumers may describe. In reviewing these results, one must wonder how much time many of the housewives serving as subjects in reconstruction studies spend in filling out the scales. Anyone who has observed subjects running through such scales is aware of the pace achieved. Since the subject's haste may influence the structural portrait he draws, controlling the timing factor may be important.

The lower correlations found in the construction task must be understood in the context of the task parameters. Each person was reviewing and integrating five separate cues for each automobile, a relatively heavy information load. The correlations obtained are comparable to those found by Einhorn (11) for similar levels of information load. These findings may indicate that subjects were (a) consistently using some model other than those represented here--perhaps a combination model in which both extremely positive <u>or</u> negative cues are weighted disproportionately or (b) shifting from strategy to strategy in the course of the study. Evidence on intra-subject reliability was not available.

One pattern of interest in the construction task concerned the success of the conjunctive and disjunctive control models. Greater use of conjunctive or disjunctive weighting under heavy time pressures was predicted since these were possible means for simplification. However the conjunctive <u>control</u> model was by far the best model in the time pressure situation. Moreover, control models were quite successful in the other condition too. This condition did not create pronounced pressures for the subjects, but also probably did not create

compelling incentives for prolonged deliberation. The basic difference between Einhorn's approximations of a disjunctive or conjunctive judgment model and the control models is in their treatment of the individual's response or utility surface. Einhorn's models include sloping response functions because the differential intra-dimensional weighting by the individual was assumed to reflect differences the person perceived as to satisfaction levels he might attain. However differential intra-dimensional weighting under conditions demanding an effort to simplify the judgment process (as examined here) do not imply anything about the individual's subjective theory of satisfaction regarding the products. It shows his adaptation to the judgment situation at hand rather than his assessment of product-related outcomes. Under extreme pressures, subjects apparently found it efficient to simplify their judgment space as depicted by the conjunctive control model. Heavy weighting of negative cues under conditions placing stress on information-processing abilities has also been found among housewives reacting to advertising (26). A dominant method of handling difficult environments may therefore be indicated. Under less pressure, there were tendencies to weight either the positive or the negative end quite heavily. In contrast, where nonlinear weighting was found in the reconstruction paradigm, it was most often accompanied by the curvilinear response surface. This implies these subjects were actually describing nonlinearity in their notions about satisfaction in car purchasing.

Another novel finding was that disjunctive weighting seemed quite prevalent in the NTP condition. No previous study comparing different models has reported success for the disjunctive model. The extended

time horizon implied by the criterion judgment in this study (an act to occur in several months) may have been a contributing factor. The saliency of positive consequences may be relatively high when the consumer is evaluating alternatives in the context of future choices, with negative consequences becoming increasingly salient as the final decision time approaches. Alternately, since these subjects were making probabilistic estimates rather than a final choice, the tendancy may have been to insure that the high probability "consideration class" featured cars with at least one or two outstanding attributes with the idea that negative attributes could be considered later when the final choice was made. One thing is clear--the interaction effects suggest it is fruitless to argue the general superiority of linear versus nonlinear models (or of different nonlinear models). Consumers will adjust the handling of their individual judgment space to suit the type of stimulus being judged, and the situation in which they are making the judgments. Rigorous examination of these influencing factors is called for.

Research Priorities

Focusing analysis on the individual consumer avoids many of the problems of interpretation inherent in cross-sectional analyses (3), and probably greatly enhances the chances of discovering that nonlinear models provide better descriptions of judgment strategies in the construction situation. This is particularly important if marketing strategists use the research as a basis for creating strategies for modifying consumer judgments, rather than merely for aggregate (and static) prediction purposes. For example, how should a marketing strategist view information about weighting factors developed from a cross sectional analysis? They do not necessarily provide a very close match to the cognitive weighting tactics actually employed by

any individual in the group. Since the individuals will respond to advertising or product changes as individuals, a campaign based on cross sectional research may be totally mistargeted (at some "average" judgment function which no individual embodies). Strategists must also beware of making hasty leaps from models validated in the reconstruction paradigm to situations where reintegration of the product information is to take place. The reconstruction paradigm describes the existing state of a subject's beliefs but not how he will proceed when a belief changes and a reevaluation becomes necessary.

The approach to analysing the judgment strategy of consumers taken in this study must be put in perspective. When used as a model of human judgment the linear regression model has traditionally acknowledged only differences in the weighting of whole dimensions (estimated by beta coefficients) but not in the weighting of locations along those dimensions (i.e., of different characteristics). The models introduced by Einhorn (and the control models) retain the ability to examine differential dimension weighting while adding an ability to examine how separate cues are weighted. Of course simply rescaling the input data via log transforms in order to obtain a better fit might be trivial if it is done on the assumption that the original scales were not subjectively equal interval. However if these transforms correspond to meaningful and distinct differences in a consumer's judgment space, and it can be demonstrated that the consumer himself appears to perform something akin to such transformations in adapting to different situations, the models offer a useful means for researching judgmental activities. Other methods not dependent on the regression model are available of course. The Bayesian model, the ANOVA model (or closely

related "functional measurement"), and conjoint measurement models offer approaches which, like regression, derive the weighting policies of the judge from the data itself (24). Conversly, protocol based simulation networks rely on unstructured self reports by the judge of what he is thinking about. The usual procedure in attitude reserach has been to require structured "components judgments" to be reported by the individual (e.g., estimating the "affect" associated with each location along a dimension). Attitude researchers have tended to delve more into the meaning or antecedents of component cues while researchers using the regression, Bayesian or ANOVA approaches have focused more on execution and composition techniques. Marketing activities demand an understanding of the meaning of the components <u>and</u> the strategies by which they are processed. Consumer researchers should therefore be alert to the advantages of many different approaches and be willing to supplement one with the other (5). Platt has warned, "Beware of the man of one method or one instrument.....He tends to become method oriented rather than problem oriented.....the problem oriented man is at least reaching freely toward what is most important (19, p. 351)." In this vein, future research on judgment strategies may find it desirable to attempt supplementing the model-fitting approach demonstrated with protocols gathered from the subjects and coded, or with self estimates of the weighting parameters being used. These may serve to validate the mathematical approximations since merely producing a high correlation does not necessarily mean that a model has captured the true nature of the cognitive processing involved. They can also supply evidence on how sensitive consumers are to shifts in their own judging tactics. Further

experimental testing in which variables which theoretically should have an effect on the consumer's choice of judgment rules are manipulated and effects on the mathematical models observed also will serve a validating function.

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TABLE 1

COMPARISONS OF MULTIPLE CORRELATIONS FOR EACH MODEL

Construction						Reconstruction					
SUBJECT	LIN	CONJ	$CONJ_c$	DISJ	$DISJ_c$	SUBJECT	LIN	CONJ	$CONJ_c$	DISJ	$DISJ_c$
1	.666	.726	.742*	.601	.598	81	.952	.962*	.896	.945	.947
2	.348	.400	.448*	.363	.297	82	.855*	.810	.815	.847	.835
3	.477	.545	.387	.636*	.565	83	.838	.841*	.828	.775	.773
4	.471*	.469	.442	.345	.434	84	.784	.849*	.803	.678	.684
5	.802	.742	.806*	.766	.757	85	.817	.788	.858*	.772	.807
6	[illegible]	.594	.625*	.600	.576	86	.816	.791	.797	.782	.844*
7	.620	.506	.677*	.496	.583	87	.589*	.445	.471	.356	.451
8	.493	.671*	.510	.579	.638	88	.653	.729*	.665	.665	.623
9	.220	.292	.371*	.227	.211	89	.900*	.895	.891	.844	.866
10	.772*	.683	.741	.681	.728	90	.882*	.849	.870	.842	.870
11	[illegible]	.723	.771*	.574	.583	91	.533	.590*	.573	.494	.491
12	.449	.378	.414	.632*	.610	92	[illegible]*	.885	.882	.867	.874
13	.574	.704*	.680	.697	.528	93	[illegible]*	.759	.742	.724	.762
14	.274	.333	.268	.539*	.510	94	[illegible]	.730*	.681	.632	.616
15	.333	.596*	.494	.382	.326	95	[illegible]	.933*	.929	.839	.903
16	.594	.592	.690*	.359	.457	96	[illegible]*	.827	.859	.799	.860
17	.353	.449	.482*	.392	.306	97	[illegible]*	.912	.912	.855	.910
18	.895	.845	.900*	.731	.795	98	[illegible]	.703*	.649	.665	.650
19	.492	.530	.545*	.520	.459	99	.772	.733*	.730	.735	.763
20	.420	.375	.415	.390	.445*	100	.485	.361	.374	.697*	.667
21	.814	.779	.833*	.736	.742	101	.721*	.699	.636	.682	.693
22	.712	.709	.720*	.630	.622	102	[illegible]*	.912	.934	.899	.894
23	.550	.598	.638*	.412	.431	103	.874	.901*	.872	.798	.832
24	.698	.703	.771*	.497	.542	104	.441	.464	.418	.505*	.450
25	.768	.749	.812*	.649	.623	105	.627	.672*	.633	.442	.454
26	.706	.724	.733*	.564	.564	106	.865*	.856	.849	.760	.779
27	.713	.749	.800*	.587	.537	107	.907*	.832	.863	.829	.847
28	.621*	.538	.600	.506	.538	108	.562	.631*	.514	.357	.410
29	.410	.342	.311	.479*	.426	109	.888*	.816	.846	.784	.868
30	.658*	.634	.648	.541	.564	110	.762	.727	.712	.783*	.766
31	.506	.318	.378	.468	.553*	111	.893*	.883	.845	.846	.839
32	.793	.732	.809*	.606	.639	112	.895*	.828	.840	.859	.872
33	.383	.299	.402*	.272	.325	113	.863	.905*	.877	.829	.854
34	.477	.545	.387	.656*	.565	114	.544	.540	.537	.519	.552*

TABLE 1 (CONTINUED)

	35	.289	.505*	.260	.463	.268	115	.778	.780*	.730	.730	.726
	36	.250	.244	.401*	.353	.259	116	.962	.929	.976*	.897	.949
	37	.749	.723	.786*	.566	.634	117	.818	.813	.819	.781	.833*
	38	.705	.708	.716*	.619	.612	118	.858*	.835	.820	.821	.847
	39	.535	.627*	.556	.542	.511	119	.786	.780	.804*	.683	.710
	40	.454	.442	.319	.561*	.549	120	.821*	.718	.783	.714	.806
NO TIME PRESSURE	41	.804*	.719	.734	.618	.667	121	.727	.774*	.762	.660	.675
	42	.734	.736	.779*	.306	.325	122	.510	.544	.529	.554*	.502
	43	.691	.729	.768*	.309	.336	123	.935	.937	.965*	.799	.860
	44	.643	.621	.600	.681*	.667	124	.902*	.880	.884	.862	.889
	45	.607	.644	.868*	.594	.597	125	.672	.689*	.667	.677	.670
	46	.514	.456	.518	.641*	.631	125	.917*	.870	.898	.876	.873
	47	.707	.730	.678	.786*	.772	127	.837	.829	.806	.830	.843*
	48	.772*	.736	.761	.558	.620	128	.831	.931	.957*	.800	.865
	49	.699	.654	.700	.747	.787*	129	.775*	.758	.774	.749	.765
	50	.460	.454	.428	.541*	.522	130	.534	.496	.550	.575*	.521
	51	.560	.587	.536	.663*	.658	131	.973*	.949	.945	.910	.912
	52	.631	.635	.689*	.637	.633	132	.811	.851*	.841	.847	.840
	53	.650	.616	.689*	.283	.361	133	.845*	.820	.816	.772	.786
	54	.490	.495	.510	.693*	.683	134	.803	.925*	.818	.800	.812
	55	.505*	.447	.476	.281	.297	135	[illegible]	.469	.482	.506*	.500
	56	.534	.546	.533	.553	.598*	136	.599*	.873	.860	.880	.832
	57	.785	.832	.868*	.578	.600	137	.866*	.827	.826	.721	.747
	58	.698	.600	.617	.698*	.663	138	.788	.859*	.836	.802	.762
	59	.656*	.539	.563	.548	.527	139	.656*	.599	.633	.555	.561
	60	.806*	.686	.752	.441	.461	140	.731	.793*	.739	.760	.748
	61	.508	.474	.469	.685	.756*	141	.819	.813	.839*	.720	.743
	62	.562	.517	.525	.789*	.785	142	.833	.885	.898*	.675	.712
	63	.561	.564	.624	.692	.708*	143	.678*	.610	.617	.604	.606
	64	.707	.699	.733*	.690	.657	144	.833	.875*	.871	.760	.726
	65	.754	.733	.815*	.369	.384	145	.866*	.792	.774	.797	.806
	66	.298	.346	.345	.481	.494*	146	.520	.532	.540	.565*	.550
	67	.625*	.488	.499	.435	.424	147	.813	.846	.808	.798	.804
	68	.527	.556	.621*	.456	.532	148	.855*	.808	.803	.722	.782
	69	.690*	.669	.661	.506	.512	149	.799	.858*	.835	.847	.850
	70	.725*	.671	.699	.436	.459	150	.966*	.942	.938	.898	.903
	71	.587	.589	.596*	.374	.387	151	.522	.488	.562	.565*	.501
	72	.861*	.792	.859	.565	.602	152	.788*	.748	.759	.750	.742
	73	.747	.699	.765*	.676	.674	153	.912	.927	.962*	.812	.880
	74	.787*	.729	.749	.564	.585	154	.850	.832	.799	.840	.866*
	75	.696*	.635	.681	.611	.614	155	.925*	.870	.878	.872	.873
	76	.625*	.562	.579	.459	.469	156	.699	.715	.707	.745*	.614
	77	.659*	.611	.624	.501	.538	157	.510	.562	.540	.572*	.519

TABLE 1 (CONTINUED)

78	.435	.445	.497	.530	.533*	158	.941	.898	.963*	.745	.841
79	.257	.212	.264	.585	.610*	159	.888*	.877	.874	.850	.852
80	.692	.611	.695	.773	.798*	160	.651	.723*	.667	.690	.688

* Best fitting model

TABLE 2

ANALYSIS OF VARIANCE SUMMARY: MULTIPLE CORRELATIONS

Source	df	Mean Square	F	W^2
A (paradigm)	1	7.026	24.024[a]	.153
B (pressures)	1	14.163	48.424[a]	.322
A x B	1	.439	1.502	
C (subjects)	156	45.627		
D (models)	4	2.149	12.726[a]	.081
A x D	4	5.653	33.474[a]	.215
B x D	4	7.946	47.047[a]	.302
A x B x D	4	.091	.539	
C x D	624	26.348		

[a] $p < .001$

TABLE 3

MEAN MULTIPLE CORRELATIONS PER SUBJECT

Model	Construction			Reconstruction		
	Time Pressure	No Time Pressure	Totals	Time Pressure	No Time Pressure	Totals
LIN	.558	.650	.606	.820	.822	.820
CONJ	.586	.612	.602	.808	.810	.808
$CONJ_C$	.602	.658	.630	.812	.816	.814
DIS	.534	.752	.654	.574	.762	.678
DIS_C	.526	.790	.678	.588	.766	.688
TOTALS	.562	.702		.738	.796	
			.636			.770

[a]These means were computed by first using Fisher's z transformation on the correlations for each subject and then retransforming back to original correlations.

TABLE 4

$\underline{R}$-max FREQUENCIES FOR EACH MODEL

Model	Construction: Time Pressure	Construction: No Time Pressure	Reconstruction: Time Pressure	Reconstruction: No Time Pressure	Totals
LIN	4	13	17	15	50
CONJ	5	0	14	10	29
$CONJ_C$	23	11	3	6	43
DIS	6	8	3	7	25
DIS_C	2	8	3	2	15
TOTALS	40	40	40	40	160

TABLE 5

MEAN NUMBER OF SIGNIFICANT DIMENSIONS
PER SUBJECT[a]

	Construction	Reconstruction	Totals
Time Pressure	1.500	1.675	1.587
No Time Pressure	2.075	1.550	1.820
Totals	1.987	1.621	

TABLE 6

ANALYSIS OF VARIANCE SUMMARY: DIMENSIONS PER SUBJECT

Source	df	Mean Square	F
A (paradigm)	1	1.225	.967
B (pressures)	1	2.025	1.599
A x B	1	4.900	3.871[a]
C (within)	156	1.265	

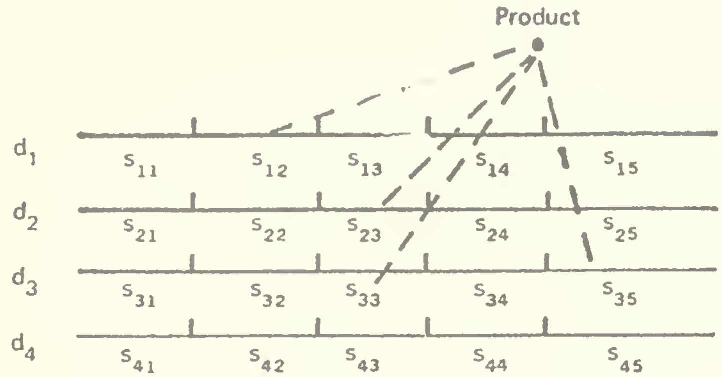
[a] $p < .05$

TABLE 7

COMPARISONS OF JUDGMENT PROFILES
FOR TWO PARADIGMS

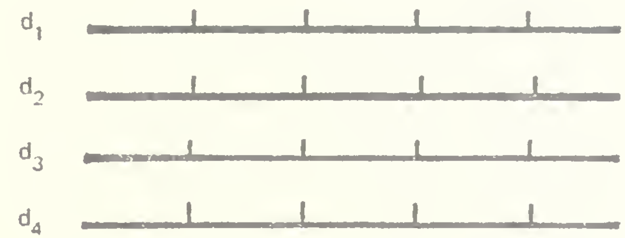
Subject	Paradigm	Best Model	Significant Dimensions[a]	Cross-Paradigm Reliability
1	RC	LIN	CM	.346
	C	CONJ	ST, CM	
2	RC	LIN	ST, CM	.665
	C	CONJ_C	ST, CM	
3	RC	LIN	RC, ST, CM	.795
	C	CONJ_C	ST	
4	RC	DISJ	SP, ST	.571
	C	CONJ	ST	
5	RC	LIN	ST, CM	.477
	C	DIS	SP, ST, CM	
6	RC	CONJ	(none)	.758
	C	CONJ	(none)	
7	RC	LIN	EH	.619
	C	DISJ_C	SP, ST, CM	
8	RC	DISJ	ST	.587
	C	CONJ	RC, ST	
9	RC	DISJ_C	SP, CM	.456
	C	CONJ_C	ST, CM	
10	RC	DISJ_C	RC	.507
	C	CONJ	RC, CM	
11	RC	LIN	RC	.565
	C	CONJ	ST, CM	
12	RC	CONJ	ST	.674
	C	DISJ_C	(none)	
13	RC	LIN	SP	.747
	C	LIN	ST, CM	
14	RC	CONJ	SP	.579
	C	DISJ	SP, ST	
15	RC	DISJ	(none)	.451
	C	LIN	(none)	

[a] SP = Selling Price; RC = Riding Comfort; ST = Styling; CM = Cost of maintenance; EH = Ease of handling



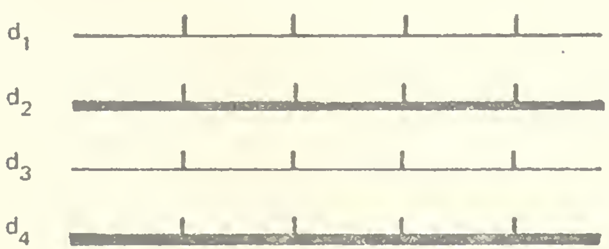
Judgment Space: Individual Projects the Product Onto Each Dimension

(b)



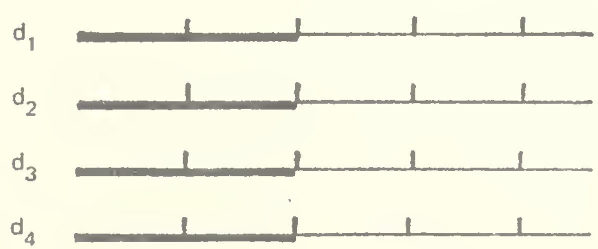
No Weighting: Attention Distributed Equally Over Entire Space

(c)



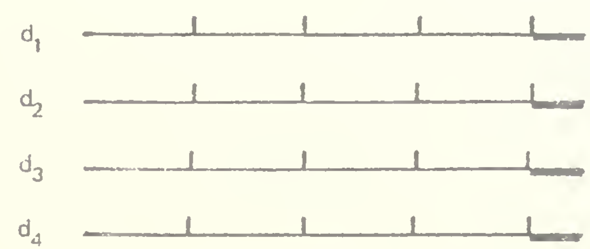
Dimensional Weighting: Attentive to Cues Along Reduced Number of Dimensions

(d)



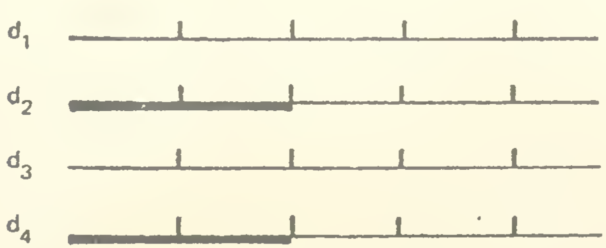
Conjunctive Weighting: Attentive to Cues in Regions of Dimensions Below the Cutoffs

(e)



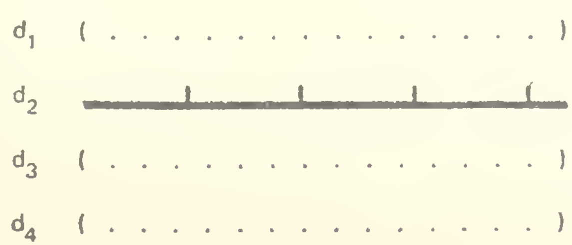
Disjunctive Weighting: Attentive to Cues in Region Adjacent to Ideal Point on Dimensions

(f)



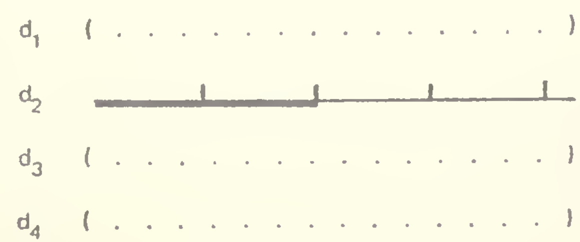
Dimensional plus Conjunctive (or Disjunctive) Weighting: Attentive to Cues Below Cutoffs (or Near Ideal Point) on Selected Dimensions

(g)



Lexicographic Weighting: Attentive to Cues Along One Dimension Only

(h)



Lexicographic plus Conjunctive Weighting: Dichotomizes Lone Dimension Making Cue Classification Easy

FIGURE 2

THE JUDGMENT MODELS

	Conceptual[a] formula	Computing formula
Linear (LIN)	$J = \sum_{i=1}^{k} b_i X_i$	$J = \sum_{i=1}^{k} b_i X_i$
Conjunctive (CONJ)[b]	$J = \prod_{i=1}^{k} X_i^{(b_i)}$	$\log J = \sum_{i=1}^{k} b_i \log X_i$
Disjunctive (DISJ)[b]	$J = \prod_{i=1}^{k} \left(\frac{1}{a_i - X_i}\right)^{b_i}$	$\log J = - \sum_{i=1}^{k} b_i \log(a_i - X_i)$
Exponential[c]	$J = \prod_{i=1}^{k} e^{b_i X_i}$	$\log J = \sum_{i=1}^{k} b_i X_i$
Conjunctive control[c] ($CONJ_C$)	$J = \sum_{i=1}^{k} b_i \log X_i$	$J = \sum_{i=1}^{k} b_i \log X_i$
Disjunctive control ($DISJ_C$)	$J = - \sum_{i=1}^{k} b_i \log(a_i - X_i)$	$J = - \sum_{i=1}^{k} b_i \log(a_i - X_i)$

[a]J is the consumer's predicted judgment for each option; X_i is the status of an option on the ith dimension; b_j is the regression weight for the ith dimension (as a whole); a is an arbitrary constant set above the highest X value so that J does not become infinite; k is the number of dimensions. In this study two values of a were used (8 or one scale point higher than the largest scale value, and 50) to see what the effect was. It was minimal so reported results are for the model with $a = 8$. In this study k was 5.

[b]From (10).

[c]From (13).